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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/733,104	12/07/2000	Steven Teig	SPLX.P0004	2615
23349	7590	10/27/2003	EXAMINER	
STATTLER JOHANSEN & ADELI P O BOX 51860 PALO ALTO, CA 94303			CHU, CHRIS C	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 10/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Applicati n No.

09/733,104

Applicant(s)

TEIG ET AL.

Examin r

Chris C. Chu

Art Unit

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-- The MAILING DATE f this c mmunication appears on the cover sheet with the correspondence address --  
Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 - 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Pri rity under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Appeal Brief***

1. In view of the appeal brief filed on June 3, 2003, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following phrases “the second section further comprising at least one conductor deposited in a Manhattan direction coupled to a

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conductor deposited in said preferred diagonal wiring direction” and “the first section further comprising at least one conductor deposited in a diagonal direction coupled to a conductor deposited in the Manhattan wiring direction” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. Applicant is required to submit a proposed drawing correction in reply to this Office action. However, formal correction of the noted defect may be deferred until after the examiner has considered the proposed drawing correction. Failure to timely submit the proposed drawing correction will result in the abandonment of the application.

Applicant argues “applicants respectfully submit that the drawings do show both these features. For instance, Figure 10 illustrates a section 1010 of metal layer 1000 that includes a Manhattan line 1012 (in this case a horizontal line) connected to a conductor in the preferred diagonal direction of the section 1010. In addition, Figure 14 illustrates interconnected horizontal and diagonal wiring.” This argument is not persuasive. First, applicant does not clearly redefine the claim term “Manhattan or Manhattan wiring direction” in the rejected claims that the Manhattan or Manhattan wiring direction is a horizontal line direction. Second, applicant should note that the usual meaning of the term “Manhattan” is a rectangular or right-angle rectilinear.

Since Fig. 10 and Fig. 14 are not illustrated the rectangular or right-angle rectilinear line coupled to a conductor deposited in the preferred diagonal wiring direction, the objection to the drawings is maintained.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1 and 17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 1, the specification fails to disclose the **second section** further comprising at least one conductor deposited in a **Manhattan direction** coupled to a conductor deposited in said preferred diagonal wiring direction.

In claim 17, the specification fails to disclose the **first section** further comprising at least one conductor deposited in a **diagonal direction** coupled to a conductor deposited in the **Manhattan wiring direction**.

A **Manhattan style metallization layout** may also be called a **rectangular, or right-angle rectilinear metallization layout**. Such a metallization layout is characterized by .

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**raised, elongate structures that have only substantially right-angle deviations from being straight or linear. ... (column 1, lines 52 ~ 60 of Juengling).**

Applicant argues “applicants respectfully submit that the drawings do show both these features. For instance, Figure 10 illustrates a section 1010 of metal layer 1000 that includes a Manhattan line 1012 (in this case a horizontal line) connected to a conductor in the preferred diagonal direction of the section 1010. In addition, Figure 14 illustrates interconnected horizontal and diagonal wiring.” This argument is not persuasive. First, applicant does not clearly redefine the claim term “Manhattan or Manhattan wiring direction” in the rejected claims and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term that the Manhattan or Manhattan wiring direction is a horizontal or vertical line direction. Second, applicant should notes that the usual meaning of the term "Manhattan" is a rectangular or right angle rectilinear and a non rectangular or none right angle rectilinear is called “non-Manhattan”. The wiring in Fig. 10 and Fig. 14 are non-Manhattan wirings. Thus, Fig. 10 and Fig. 14 are not illustrated Manhattan wirings, that has rectangular or right angle rectilinear line, coupled to a conductor deposited in the preferred diagonal wiring direction, the rejection is maintained.

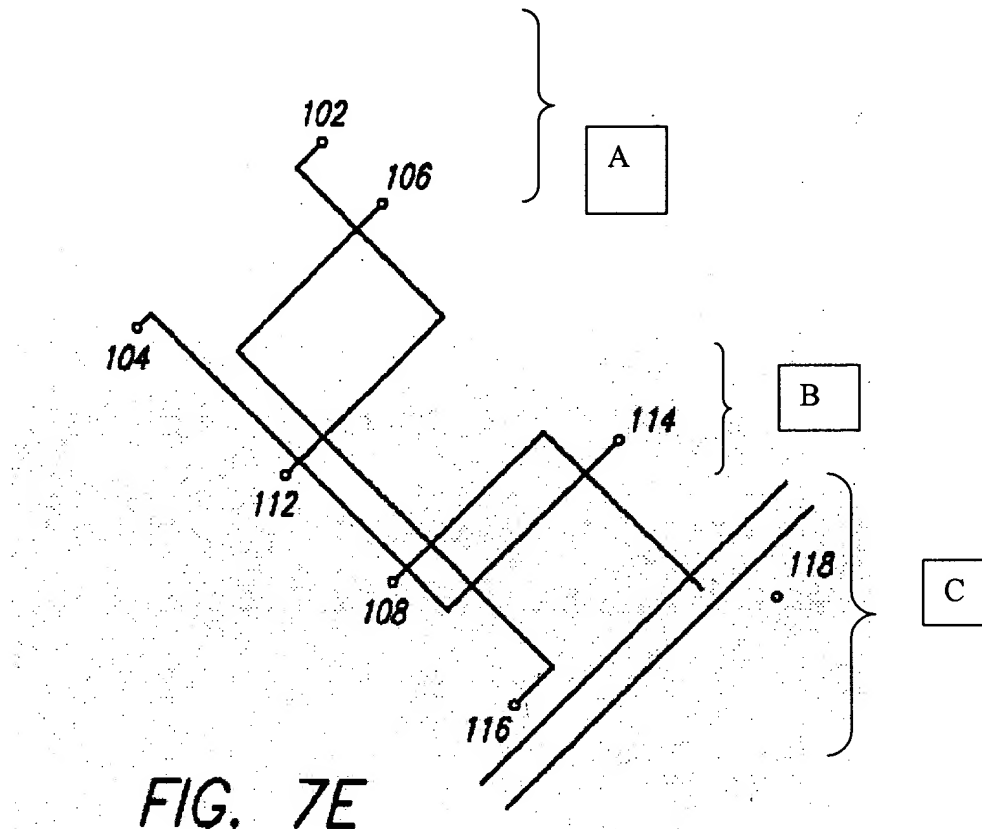
***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 ~ 9, 11 and 13 ~ 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. in view of Endo et al.



Regarding claim 1, Jones et al. discloses in Fig. 7E an integrated circuit comprising:

- at least one metal layer comprising a plurality of sections (A, B and C), each section comprising conductors situated in a contiguous area to interconnect points on the integrated circuit, wherein a preferred direction, within a section, defines a direction,

relative to the boundaries of the integrated circuit, for at least fifty percent of conductors in the section;

- a first section (A) comprising a first preferred direction for the conductors deposited in the first section; and
- a second section (C) comprising a preferred diagonal wiring direction for the conductors deposited in the second section, such that the diagonal wiring preferred direction is a direction different from the first preferred direction, said second section (C) further comprising at least one conductor (116) deposited in a Manhattan direction coupled to a conductor deposited in said preferred diagonal wiring direction.

Jones et al. does not disclose at least one thousand conductors situated in a contiguous area. However, Endo et al. teaches in column 12, lines 46 ~ 50 at least one thousand conductors situated in a contiguous area (U or D or L or R). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Jones et al. by using the one thousand conductors situated in a contiguous area as taught by Endo et al. The ordinary artisan would have been motivated to modify Jones et al. in the manner described above for at least the purpose of improving the yield (column 12, line 50).

Regarding claim 2, Jones et al. discloses in Fig. 7E the first preferred direction comprising a diagonal direction.

Regarding claim 3, Jones et al. discloses in Fig. 7E the first preferred diagonal direction comprising a direction perpendicular to said preferred diagonal wiring direction in said second section.



Regarding claim 4, since Jones et al. does not limit the diagonal direction to any particular or specific direction, hence his/her disclosure encompasses all well known direction including an “octalinear direction.”

Regarding claim 5, since Jones et al. does not limit the diagonal direction to any particular or specific direction, hence his/her disclosure encompasses all well known direction including a “hexalinear direction.”

Regarding claim 6, Jones et al. discloses in Fig. 7E the first preferred direction comprising a first diagonal direction; and the second preferred direction comprising a second diagonal direction, different from the first diagonal direction.

Regarding claim 7, since Jones et al. does not limit the first or the second diagonal direction to any particular or specific direction, hence his/her disclosure encompasses all well known direction including an “octalinear direction” and the second diagonal direction is complementary to the first diagonal direction.

Regarding claim 8, since Jones et al. does not limit the first or the second diagonal direction to any particular or specific direction, hence his/her disclosure encompasses all well known direction including a “hexalinear direction” and the second diagonal direction is complementary to the first diagonal direction.

Regarding claim 9, since Jones et al. does not limit the first or the second diagonal direction to any particular or specific direction, hence his/her disclosure encompasses all well known direction including an “octalinear direction” for the first diagonal direction and a “hexalinear direction” for the second diagonal direction.

Regarding claim 11, Jones et al. discloses in Fig. 7E at least one more additional section (B) having a preferred direction comprising a diagonal direction.

Regarding claim 13, Jones et al. discloses in Fig. 7E at least one additional wire deposited in a section with a direction different than the preferred direction of the section.

Regarding claim 14, Jones et al. discloses in Fig. 7E the preferred direction comprising a diagonal direction; and the direction different than the preferred direction comprising a Manhattan direction (114).

Regarding claim 15, Jones et al. discloses in Fig. 7E the preferred direction comprising a Manhattan direction (114); and the direction different than the preferred direction comprises a diagonal direction.

Regarding claim 16, Jones et al. discloses in Fig. 7E the direction different than the preferred direction comprising a direction complementary to the preferred direction.

Regarding claim 17, Jones et al. discloses in Fig. 7E an integrated circuit comprising:

- at least one metal layer comprising a plurality of sections (A, B and C), each section comprising conductors situated in a contiguous area to interconnect points on the integrated circuit, wherein a preferred direction, within a section, defines a direction, relative to the boundaries of the integrated circuit, for at least fifty percent of conductors in the section;
- a first section (A) comprising a Manhattan wiring (102) direction for the conductors deposited in the first section; the first section further comprising at least one conductor deposited in a diagonal direction (112) coupled to a conductor deposited in the Manhattan wiring direction; and

- a second section (C) comprising a preferred diagonal wiring direction for the conductors deposited in the second section, such that the diagonal wiring preferred direction is a direction different from the first preferred direction.

Jones et al. does not disclose at least one thousand conductors situated in a contiguous area. However, Endo et al. teaches in column 12, lines 46 ~ 50 at least one thousand conductors situated in a contiguous area (U or D or L or R). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Jones et al. by using the one thousand conductors situated in a contiguous area as taught by Endo et al. The ordinary artisan would have been motivated to modify Jones et al. in the manner described above for at least the purpose of improving the yield (column 12, line 50).

8. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. and Endo et al. as applied to claim 1 above, and further in view of Rostoker et al. (U.S. Pat. No. 5,650,653).

Regarding claim 10, Jones et al. discloses the claimed invention except the first preferred direction comprising a first Manhattan direction. However, Rostoker et al. discloses in Fig. 2 a first preferred direction comprising a first Manhattan direction (the top part of 152 in an area 238). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify Jones et al. by using a first Manhattan direction for a first preferred direction as taught by Rostoker et al. The ordinary artisan would have been motivated to further modify Jones et al. in the manner described above for at least the purpose of decreasing electromigration failure (column 4, lines 15 ~ 17 of Juengling).

Regarding claim 12, Jones et al. discloses the claimed invention except at least one more section having a preferred direction comprising a Manhattan direction. However, Rostoker et al. discloses in Fig. 2 at least one more section having a preferred direction comprising a Manhattan direction (the top part of 152 in an area 238). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify Jones et al. by using a Manhattan direction for a preferred direction in at least one more section as taught by Rostoker et al. The ordinary artisan would have been motivated to further modify Jones et al. in the manner described above for at least the purpose of decreasing electromigration failure (column 4, lines 15 ~ 17 of Juengling).

### ***Response to Arguments***

9. Applicant's arguments with respect to claims 1, 3, 7 – 9 and 14 - 16 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu  
Examiner  
Art Unit 2815

C.C.

10/10/03 2:22:22 PM

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800